

PATENT ABSTRACTS OF JAPAN

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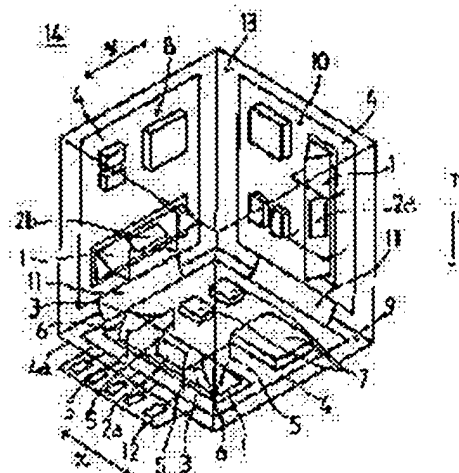
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(54) MULTI-AXIAL DETECTION TYPE VIBRATION GYRO

(57)Abstract:

PURPOSE: To easily provide a multi-axial detection type vibration gyro which can easily detect a rotational angular velocity in multi axial directions, help miniaturize a set and shorten a mounting time.

CONSTITUTION: Three vibration gyros 8, 9 and 10 are coupled via a flexible substrate 11. The vibration gyros 8 and 10 are set, upright at right angles to the vibration gyro 9, which are stored in a case 13. The thus-constituted gyro is in the form of a prism as a whole.



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CLAIMS

[Claim(s)]

[Claim 1] The multiaxial detection mold oscillating gyroscope characterized by carrying out solid assemblage of two or more oscillating gyroscopes in one.

[Claim 2] The multiaxial detection mold oscillating gyroscope according to claim 1 characterized by having arranged said oscillating gyroscope in the direction of a three dimension, and assembling it to a prismatic form as a whole.

[Claim 3] The multiaxial detection mold oscillating gyroscope according to claim 1 characterized by having arranged said oscillating gyroscope in the direction of a three dimension, and assembling it in the shape of a pyramid as a whole.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] About a multi-axial detection mold oscillating gyroscope, by detecting the angular rate of rotation, this invention detects the location of a mobile, detects the navigation system which performs suitable induction, or external vibration, and relates to a multi-axial detection mold oscillating gyroscope applicable to vibration removal systems, such as a hand deflection arrester which performs suitable vibration deadening, etc. especially, for example.

[0002]

[Description of the Prior Art] The conventional oscillating gyroscope is explained referring to drawing 3. In three side faces of the oscillating object 22, piezoelectric devices 23a, 23b, and 23c fix the conventional oscillating gyroscope 21 including the oscillating object 22 of the Shozo prismatic form formed by iso-elasticity alloy material, such as an elinvar, respectively. An electrode is formed in both sides of a piezo-electric ceramic, and, as for these piezoelectric devices 23a, 23b, and 23c, the digital disposal circuit 29 later mentioned between piezoelectric devices 23a and 23b and piezoelectric-device 23c is connected.

[0003] And the oscillating object 22 is attached in the support substrate 25 through the supporter material 24 and 24 which consists of wire rods, such as a metal. That is, the supporter material 24 and 24 is formed in the shape of [which consists of the Division for Interlibrary Services 27 which connects between the leg 26 of a pair and the leg 26] a cross-section KO character, the Division for Interlibrary Services 27 is attached in the ridgeline part near the node point of the oscillating object 22, and the legs 26 and 26 are attached in the support substrate 25, respectively.

[0004] The guide-peg member 28 caudad prolonged from the both ends of that longitudinal direction is formed in this support substrate 25, and lobe 28a projected caudad is formed in that center of a lower limit. And the support substrate 25 fixes through attaching hole 30a by lobe 28a to the circuit board 30 in which the digital disposal circuit 29 was carried, and is further contained by the case 31.

[0005] Thus, if it is in the condition which carried out crookedness vibration and rotation centering on the shaft orientations of the oscillating object 22 is added in the direction which intersects perpendicularly with a piezoelectric-device 23c forming face, the constituted oscillating object 22 will change the oscillating direction of the oscillating object 22 by Coriolis force, and a difference will produce it in the output voltage of piezoelectric devices 23a and 23b according to it. And the angular rate of rotation which joined the oscillating gyroscope 21 is detectable by measuring the difference of this output voltage with a digital disposal circuit 29.

[0006]

[Problem(s) to be Solved by the Invention] However, although the oscillating gyroscope was needed with such a conventional oscillating gyroscope for every shaft which detects the angular rate of rotation when the angular rate of rotation in the direction of a multiple spindle was detected, mounting an oscillating gyroscope for a majority of every shafts took the location, and it also cut mounting time amount in many.

[0007] So, the main purpose of this invention is being able to perform easily detection of the angular rate of rotation in the direction of a multiple spindle, it serving as an aid of a miniaturization of the set to mount, and offering the multiaxial detection mold oscillating gyroscope which can shorten mounting time amount.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is characterized by carrying out solid assemblage of two or more oscillating gyroscopes in one, arranges said oscillating gyroscope in the direction of a three dimension, and is characterized by constituting a prismatic form or in the shape of a pyramid as a whole.

[0009]

[Function] According to the above-mentioned configuration, detection of the angular rate of rotation in the direction of a multiple spindle can be easily performed by carrying out solid assemblage of two or more oscillating gyroscopes in one.

[0010]

[Example] Hereafter, one example of the multiaxial detection mold oscillating gyroscope by this invention is explained using a drawing. In drawing 1, 1 is an oscillating object which consists of iso-elasticity alloy material, such as a forward triangle pole-like elinvar, or a quartz, glass, Xtal, etc., and piezoelectric-device 2a in which the electrode was formed to both sides of a piezo-electric ceramic, 2b, and 2c have fixed it with adhesives etc. in the side face. The supporter material which consists of wire rods, such as a metal with which 3 supports the oscillating object 1, and 4 are the support substrates of the abbreviation square which attaches the oscillating object 1 by the supporter material 3, the supporter material 3 is formed in the shape of [which consists of the Division for Interlibrary Services 6 which connects between the leg 5 of a pair, and the leg 5] a cross-section KO character, the Division for Interlibrary Services 6 is attached in the ridgeline part near the node point of the oscillating object 1, and the legs 5 and 5 are attached in the support substrate 4, respectively. 7 is a digital disposal circuit carried in the support substrate 4 like the oscillating object 1, it connects between piezoelectric-device 2a of the oscillating object 1, and 2b and piezoelectric-device 2c, the angular rate of rotation centering on the shaft orientations of the oscillating object 1 is detected, and the oscillating gyroscopes 8, 9, and 10 are constituted by these oscillating objects 1, the supporter material 3, the support substrate 4, and the digital disposal circuit 7, respectively.

[0011] Next, three oscillating gyroscopes 8, 9, and 10 constituted as mentioned above are arranged so that each support substrate 4 may become a letter of the abbreviation for L characters in the state of an expansion flat surface. And each support substrate 4 is connected through the flexible substrate 11 which contained the electric track and which can be bent, and this connects the oscillating gyroscopes 8, 9, and 10. And each oscillating gyroscopes 8, 9, and 10 are electrically connected with a part for the external terminal area 12 prepared in one-side 4a which is not connected with the oscillating gyroscopes 8 and 10 among the support substrates 4 which constitute the oscillating gyroscope 9. Furthermore, by bending the flexible substrate 11, the oscillating gyroscopes 8 and 10 are made to stand up perpendicularly to the oscillating gyroscope 9, where a part for the external terminal area 12 is projected outside, it contains in a case 13, and the prismatic form multiaxial detection mold oscillating gyroscope 14 is constituted as a whole.

[0012] In addition, in this example, although the oscillating gyroscopes 8, 9, and 10 are contained in a case 13 and the multiaxial detection mold oscillating gyroscope is constituted, you may constitute in a prismatic form as a whole by forming the support substrate 4 and the auxiliary substrate of the same configuration and magnitude in the location which counters each support substrate 4, and connecting each other with it, without using a case 13. Moreover, in this example, although explained using the multiaxial detection mold oscillating square pole-like gyroscope 14, other prismatic forms, such as the shape of a pentagonal prism, are sufficient.

[0013] With such a multiaxial detection mold oscillating gyroscope 14, each shaft orientations x of the oscillating object 1 of the oscillating gyroscopes 8, 9, and 10 and the angular rate of rotation consisting mainly of y and z are detectable. Moreover, since the area mounted by being constituted in three

dimensions upwards does not need to be small, either and it is not necessary to become an aid of a miniaturization of a set and to mount an oscillating gyroscope separately like before, mounting time amount can also be shortened.

[0014] Next, the 2nd example of the multiaxial detection mold oscillating gyroscope of this invention is explained using drawing 2. Here, the same number is given to a part the same as that of the 1st example, or equivalent, and the explanation is omitted. As shown in drawing 2, in this example, the support substrate 15 is formed in the shape of an equilateral triangle, and the oscillating gyroscopes 16, 17, 18, and 19 are constituted by the oscillating object 1, the supporter material 3, the support substrate 15, and the digital disposal circuit 7, respectively. Thus, four constituted oscillating gyroscopes 16, 17, 18, and 19 are arranged so that each support substrate 15 may become abbreviation equilateral triangle-like in the state of an expansion flat surface. And each support substrate 15 is connected through the flexible substrate 11, and the oscillating gyroscopes 16, 17, 18, and 19 are connected. And each oscillating gyroscopes 16, 17, 18, and 19 are electrically connected with a part for the external terminal area 12 prepared in one-side 15a which is not connected with the oscillating gyroscope 16 of the support substrate 15 which constitutes the oscillating gyroscope 17. Furthermore, by bending the flexible substrate 11, the oscillating gyroscopes 16, 17, 18, and 19 are combined in the shape of a pyramid, and the multiaxial detection mold oscillating gyroscope 20 is constituted.

[0015] In addition, in this example, although explained using the multiaxial detection mold oscillating triangular pyramid-like gyroscope 20, other shape of a pyramid, such as the shape of a square drill, has. Moreover, in the 1st and 2nd example, although explained using the oscillating forward triangle pole-like object 1, other prismatic forms are sufficient as it, and even when the square pole etc. is cylindrical, it is good.

[0016] Also in such a multiaxial detection mold oscillating gyroscope 20, the angular rate of rotation in the direction of a multiple spindle is detectable. Moreover, since the area mounted by being constituted in three dimensions upwards does not need to be small, either and it is not necessary to become an aid of a miniaturization of a set and to mount an oscillating gyroscope separately like before, mounting time amount can also be shortened.

[0017]

[Effect of the Invention] According to this invention, the angular rate of rotation in the direction of a multiple spindle can detect easily by arranging an oscillating gyroscope in three dimensions, and as explained above, since it is not necessary to become an aid of a miniaturization of a set since the area to mount is not taken, either, and it is not necessary to mount an oscillating gyroscope separately like before, mounting time amount can also be shortened.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] (A) is the development view showing the multiaxial detection mold oscillating gyroscope in one example of this invention, and (B) is the perspective view.

[Drawing 2] (A) is the development view showing other examples, and (B) is the perspective view.

[Drawing 3] It is the decomposition perspective view showing the conventional oscillating gyroscope.

[Description of Notations]

8 Oscillating Gyroscope

9 Oscillating Gyroscope

10 Oscillating Gyroscope

11 Flexible Substrate

13 Case

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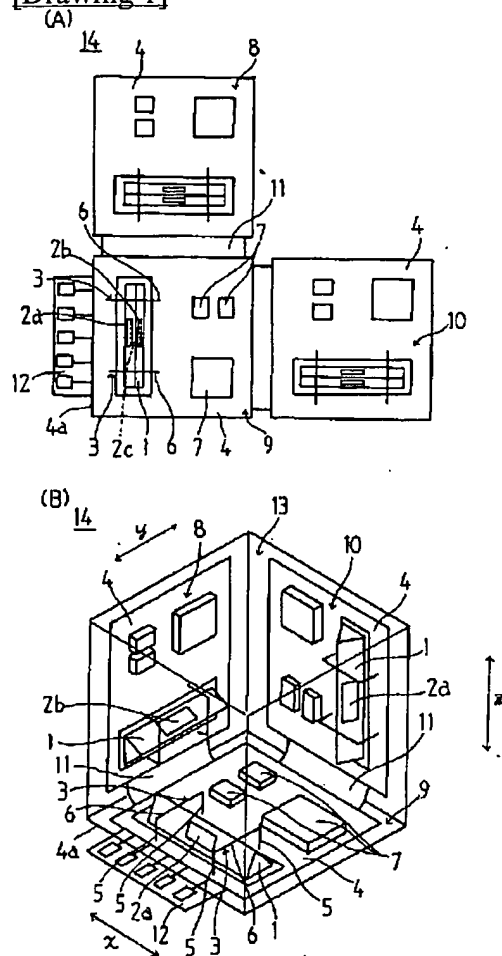
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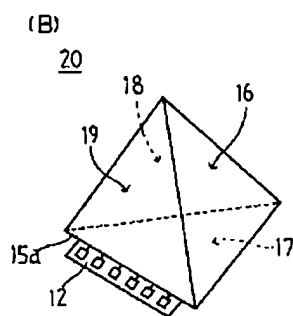
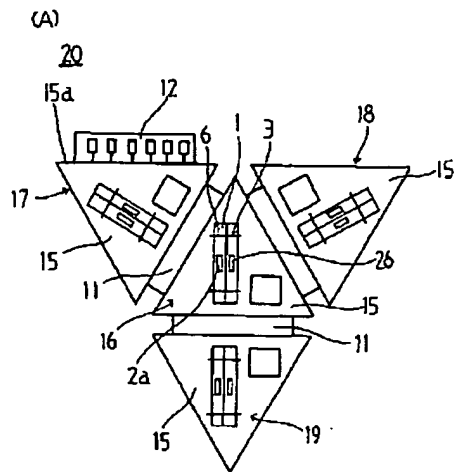
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DRAWINGS

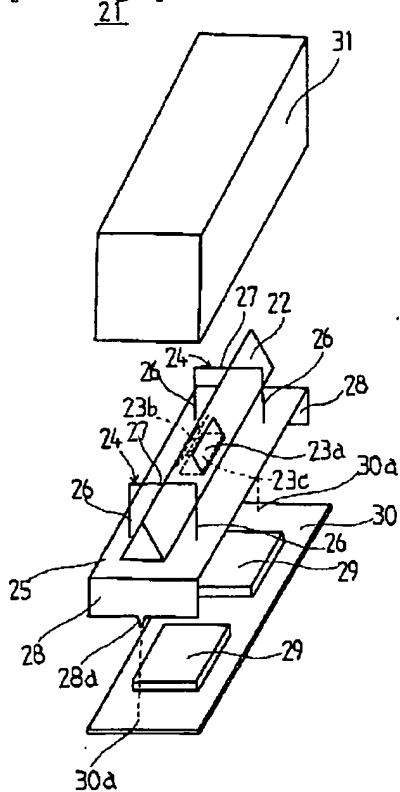
[Drawing 1]



[Drawing 2]



[Drawing 3]



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